

COLORADO RIVER RECOVERY PROGRAM
FY 2012 ANNUAL PROJECT REPORT

RECOVERY PROGRAM
PROJECT NUMBER: RZ-RECR

I. Project Title: Razorback emigration from the Stirrup floodplain

II. Bureau of Reclamation Agreement Number(s): #R07AP40676

Project/Grant Period: Start date (Mo/Day/Yr): 8/30/2007
End date: (Mo/Day/Yr): 12/1/2012
Reporting period end date: 9/30/2012
Is this the final report? Yes _____ No X

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IV. Abstract:

Reproduction by razorback sucker (*Xyrauchen texanus*) occurs on the ascending limb of the spring hydrograph as an adaptation for entrainment of larvae into highly productive floodplain habitats. However, it is unclear how long razorback sucker use these nursery habitats before moving into riverine habitats. Thus, a variety of age classes of PIT-tagged razorback sucker have been stocked in the Stirrup floodplain to research the timing of their emigration. Additionally, age-2 bonytail (*Gila elegans*) were stocked, providing an opportunity to investigate whether there are benefits for stocking this species in off-channel habitats. Due to extreme drought conditions, floodplain connection did not occur in 2012 at the Stirrup. However, the complete absence of stocked fish during extensive recapture attempts suggests that 2012 will serve as an excellent opportunity to reset this wetland for future investigations.

V. Study Schedule: FY2007–FY2012

VI. Relationship to RIPRAP:

GENERAL RECOVERY PROGRAM SUPPORT ACTION PLAN

- II. Restore habitat (habitat development and maintenance).
- II.A. Restore flooded bottomland habitats.
- II.A.1. Conduct inventory of flooded bottomlands habitat for potential restoration.

IV. Manage genetic integrity and augment or restore populations (stocking endangered fishes).

V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).

GREEN RIVER ACTION PLAN: MAINSTEM

II. Restore habitat (habitat development and maintenance).

II.A. Restore and manage flooded bottomland habitat.

II.A.1. Conduct site restoration.

II.A.2. Acquire interest in high-priority flooded bottomland habitats between Ouray NWR and Jensen to benefit endangered fish.

II.A.2.a. Identify and evaluate sites.

IV. Manage genetic integrity and augment or restore populations (stocking endangered fishes).

V. Monitor populations and habitat and conduct research to support recovery actions (research, monitoring, and data management).

V.A. Conduct research to acquire life history information and enhance scientific techniques required to complete recovery actions.

VII. Accomplishment of FY 2012 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1. Pump water from the Green River into the Stirrup floodplain to maintain sufficient water quality. This includes preparation of compliance documents for the Utah Division of Water Rights (the EA for work on BLM property was finalized in 2007).

To increase overwinter survival of remaining stocked razorback sucker and bonytail, water was pumped into the floodplain in the fall of 2011 (November 15–21) just prior to ice cover. Pumping was discontinued when we observed backflow out of the floodplain (i.e., wetland completely full). The Stirrup wetland will not be filled prior to the winter of 2012-2013.

Task 2. Stock razorback sucker in the Stirrup floodplain.

No additional fish were selected for stocking into the Stirrup floodplain by the Recovery Program in 2012.

Task 3. Water quality monitoring and fish sampling in the Stirrup floodplain.

Water quality was monitored on three dates in 2012 (Table 1) following 2011 fall pumping. Measurements from a Multi-probe Sonde, set to record data at 30-second intervals, were averaged for approximately five minute readings taken during each sampling event. In addition, temperature and dissolved oxygen concentrations were

measured continuously beginning 2 May 2012 using a miniDOT Logger (PME Inc., Vista, CA) set to record data at 30-minute intervals, which we then averaged for one-week intervals to monitor changes through time (Table 1). The miniDOT Logger was retrieved on 26 October 2012, at which time we determined that it stopped logging data on 8 June 2012 because of a dead battery. The battery for this unit was specified to have a 5-yr lifespan, which is why we did not check the unit after initial deployment (first time the unit was used). Overall, it appears that adequate oxygen levels necessary to avoid a fish kill were present following fall pumping and into the summer (Table 1). However, following the initial surge of primary production (likely in the middle of May), it appears that water quality began to decline in the beginning of June (Table 1) and we suspect that this trend was greatly amplified as water levels decreased throughout the summer.

Table 1. Water quality measurements at the Stirrup floodplain. Open water measurements were taken from mid-water column and measurements during ice cover were taken near the substrate, at mid-water column, and just below the ice surface.

Date	Temp. (°C)	DO (mg/L)	pH	Cond. (µS)	Ice Depth (in.)	Snow Depth (in.)
2/1/2012	4.01	12.87	9.22	623.81	12	0.5
3/5/2012	7.87	13.31	9.8	440.94	-	-
4/12/2012	12.57	9.34	10.09	440.5	-	-
5/2-8/2012	15.11	8.56	-	-	-	-
5/9-15/2012	16.32	9.58	-	-	-	-
5/16-22/2012	18.46	10.58	-	-	-	-
5/23-29/2012	16.61	10.32	-	-	-	-
5/30/2012 - 6/8/2012	19.54	9.42	-	-	-	-

We used a variety of sampling techniques to monitor the fish community in the Stirrup floodplain in an attempt to recapture stocked PIT-tagged fish. Given the ongoing drought conditions of 2012, sampling efforts were also conducted as a rescue operation for native fishes in order to return them to the Green River. On 16-17 July 2012, we deployed multiple gear types. Specifically, on 16 July 2012 we set one trammel net perpendicular to shore and then proceeded with two boat electrofishing transects along the shoreline encompassing the perimeter of the wetland. Electrofishing transects terminated on each side of the trammel net, which was then pulled to collect entrapped fishes. Following electrofishing efforts, we deployed 12 fyke nets throughout the wetland for a 24-hr period. Upon retrieval of fyke nets on 17 July 2012, we conducted one final boat electrofishing transect where we fished in a zigzag pattern from shoreline to shoreline to encompass all of the deepest areas of the wetland, while also thoroughly covering the entire water body. Total catch was entirely comprised of nonnative fishes, whereas native species and/or PIT-tagged stocked fish were not captured during this effort (Table 2). A final salvage attempt for native fish was conducted on 3 October 2012, when five additional fyke nets were fished for a 24-hr period. Conditions at this time did not allow the use trammel nets or electrofishing due to diminished water depth. Additionally,

seining would have been ineffective given the extensive mud depth and vegetation throughout the wetland. Although fyke nets were the gear of choice, nets were completely ineffective (too far out of the water) and we did not capture a single fish. Upon further inspection during a site visit on 26 October 2012, we observed numerous adult and juvenile common carp and black bullhead.

To determine the overall effects of the 2012 drought on the Stirrup floodplain (i.e., how much it shrank), we made a site visit on 30 October 2012 to gather additional information for a final area and depth profile of the wetland before ice cover. To measure overall depth we took evenly spaced measurements (to the top of the sediment) along two transects that encompassed the greatest length and width of the wetland; the remaining wetland was nearly a perfect oval shape. Mean depth from 27 measurements was 19.9 ± 1.6 cm, with a maximum depth of 31 cm. In addition, we gathered 18 UTM coordinates along the perimeter of the wetland, which we then plotted using ArcMap v.10 to create a polygon shape file. Using the X-Tools Pro Package v.9.1, we calculated overall area of the wetland to be 2.6 hectares (6.47 acres), which is approximately 30% of the total volume when completely filled. Due to the final bathymetry of the Stirrup floodplain and subsequent water quality conditions prior to the upcoming winter, we are quite confident that there will be a complete fish kill over winter, especially under colder conditions.

Table 2. Fish sampling conducted at the Stirrup floodplain from 16-17 July 2012. Data from similar gear types was combined.

Species	Fyke Nets	Electrofishing	Trammel Net
Black bullhead	10	6	2
Bluegill	428	14	–
Common carp	18	60	30
Fathead minnow	–	81	–
Green sunfish	56	50	2
Iowa darter	–	1	–
Red shiner	–	1	–
White sucker	14	4	–

Task 4. Install stationary PIT reader and antennas prior to peak flows.

The reader and antennas were in place on 27 April 2012; antenna 4 was closest to the river, antenna 1 was closest to the floodplain, and antenna 3 was in between – all antennas were separated by approximately 20 feet. Antennas were initially tuned until 2 May 2012. Even without conducting any fine-tuning upon floodplain connection, which did not occur in 2012 (Figure 1), all antennas displayed excellent detection efficiency¹ with low noise levels (0–12%) and high amps (4.69, 4.91, 3.81 amps for antennas 1, 3,

¹ Detection efficiency is defined here as the number of test tags actually fired / the number of test tags that should have been fired by that antenna (set to occur once per hour) x 100.

and 4 respectively). Despite excellent system operation, we did not gather any data from the stationary antennas in 2012 and fine-tuning was not necessary.

Task 5. Download PIT tag data and monitor PIT tag array.

With a peak flow in the mainstem Green River of only 10,300 cfs (achieved on 25 May 2012) the Stirrup floodplain did not breach (Figure 1). Therefore, fish movement between the floodplain and the Green River was not possible in 2012 and this task was not required.

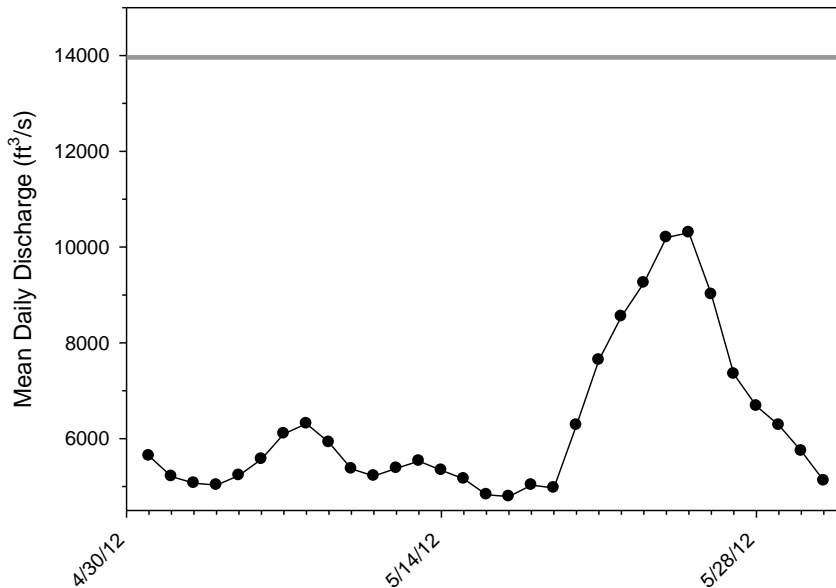


Figure 1. Mean daily discharge for the Green River at Jensen, Utah (USGS; provisional data). The Stirrup floodplain connects to the river at approximately 14,000 cfs (grey line). Note that lag time for flows from Jensen to the Stirrup is approximately 24 hours.

Task 6. Summarize results and reporting.

We are submitting the annual progress report to the Recovery Program in November 2012.

VIII. Recommendations:

- Given the poor conditions of the Stirrup floodplain following the 2012 drought, we suspect that a complete fish kill will occur over winter 2012-2013. Although it is discouraging knowing that some endangered fishes likely remain in the wetland, we have made extensive attempts to salvage these fish and suspect that only a limited number of individuals will perish. It is important to realize, however, that 2012 provides an excellent opportunity for this wetland to

completely reset for any potential future investigations (i.e., Larval Trigger Study Plan) and we recommend that consideration of this floodplain by the Recovery Program continue for such purposes as pertinent studies arise.

- Although floodplain connection did not occur in 2012, we have greatly refined our stationary PIT antenna operation throughout the lifetime of this project and would like to continue to use this equipment for pertinent projects. Therefore, we recommend that we shift the use of this equipment to the Stewart Lake floodplain (Project #FR165), which can be manipulated to entrain flows, even during extremely low peak flows as observed in 2012.

IX. Project Status:

Unless otherwise advised by the Recovery Program (i.e., if additional fish are stocked at the Stirrup floodplain), this project will not continue beyond FY2012.

X. FY 2012 Budget Status

- A. Funds Provided: \$20,775
- B. Funds Expended: \$20,775
- C. Difference: \$0
- D. Percent of the FY 2012 work completed, and projected costs to complete: 100%
- E. Recovery Program funds spent for publication charges: \$0

XI. Status of Data Submission (Where applicable):

There is no data to submit to the Recovery Program database manager from 2012.

XII. Signed: Matthew J. Breen 11/2/12
Principal Investigator Date